

I/WE CLAIM:

1. An image tracking apparatus for tracking the movement of an image of a corresponding moving object, the apparatus comprising:

5 (a) an optical identifier device which attaches to said moving object and generates an optical identification signal; and
(b) an image capture system for receiving said image of said moving object and said optical identification signal, and generating a coordinate position value related to said image of said moving object.

10

2. The image tracking apparatus as claimed in claim 1, wherein said image capture system comprises:

15

20

(a) a camera system for receiving said image of said moving object and said optical identification signal, and generating a first and second series of image frames; and
(b) a picture frame processing system for processing said second series of image frames and generating said coordinate position value related to said image of said moving object.

3. The image tracking apparatus as claimed in claim 2, wherein said camera system comprises:

25

(a) a first camera for receiving said image of said moving object and generating said first series of image frames; and
(b) a second camera for receiving said optical identification signal and generating said second series of image frames.

SEARCHED
INDEXED
MAILED
COPIED
FILED

4. The image tracking apparatus as claimed in claim 3, wherein said first series of image frames include broadcast quality images of said moving object.

5. The image tracking apparatus as claimed in claim 4, wherein said second series of image frames include optically filtered image frames.

6. The image tracking apparatus as claimed in claim 5, wherein said second camera includes a narrow band optical filter which receives said image of said optical identification signal and generates said optically filtered image frames.

7. The image tracking apparatus as claimed in claim 6, wherein each of said optically filtered image frames include images of only said optical identification signal.

8. The image tracking apparatus as claimed in claim 7, wherein said picture frame processing system includes a coordinate detector, which receives said optically filtered image frames and generates an X and Y coordinate position signal for said optical identification signal within each of said optically filtered image frames.

9. The image tracking apparatus as claimed in claim 8, wherein said X coordinate position signal corresponds to a running average of X coordinate position values determined from each of said optically filtered image frames; and said Y coordinate position signal corresponds to a running average of Y coordinate position values within each of said optically filtered image frames.

10. The image tracking apparatus as claimed in claim 9, wherein
said picture frame processing system further includes a
decoder, said decoder receiving said optical identification
signal within each of said optically filtered image frames and
generating an electrical decoder signal.

5

11. The image tracking apparatus as claimed in claim 10, wherein
said picture frame processing system includes a graphics
generator, said graphics generator receiving said electrical
decoder signal and generating a graphic image containing
information associated with said image of said moving object.

10

12. The image tracking apparatus as claimed in claim 11, further
comprising a picture-in-picture processor which receives both
said X and Y coordinate position signal and generates said
coordinate position value.

15 13. The image tracking apparatus as claimed in claim 12, wherein
said picture-in-picture processor receives said broadcast
quality images of said moving object and said graphic image,
and superimposes said graphic image on said broadcast
quality images of said moving object at a position related to
20 said coordinate position value.

20

14. The image tracking apparatus as claimed in claim 13, wherein
said optical identifier device comprises:

(a) a laser controller for generating an electrical drive signal,
said electrical drive signal including a unique identifier
25 code; and

(b) a plurality of laser devices, wherein said electrical drive
signal including said unique identifier code modulates
said laser devices and generates said optical

25

identification signal.

15. The image tracking apparatus as claimed in claim 14, wherein
said laser controller includes:

5 (b) a modulation controller device for receiving an enable
 signal and generating said electrical drive signal; and

10 (a) a synchronization device for generating said enable
 signal such that said electrical drive signal modulates
 said lasers in phase with said decoder device receiving
 said optical identification signal within each of said
 optically filtered image frames.

16. The image tracking apparatus as claimed in claim 2, wherein
said camera system includes a camera device comprising:

15 (a) an optical splitter system for receiving said image of said
 moving object and said optical identification signal, and
 generating a first and second optical signal along a first
 and second orthogonal path;

20 (b) a first camera device positioned along said first
 orthogonal path to receive said first optical signal and
 generate said first series of image frames ; and

 (c) a second camera device positioned along said second
 orthogonal path to receive said second optical signal and
 generate said second series of image frames.

17. The image tracking apparatus as claimed in claim 16, wherein
said optical splitter system comprises:

25 (a) a lens system for receiving said image of said moving
 object and said optical identification signal and producing
 a collimated optical beam;

 (b) an optical beam splitter for receiving said collimated
 optical beam and producing a first collimated optical

output along said first orthogonal path; and producing a second collimated optical output along said second orthogonal path.

18. The image tracking apparatus as claimed in claim 17, further comprising a first and second focusing lens, wherein said first focusing lens receives said first collimated optical output and produces said first optical signal; and said second focusing lens receives said second collimated optical output and produces said second optical signal.

10 19. The image tracking apparatus as claimed in claim 18, wherein said first optical signal is said image of said moving object and said second optical signal is said optical identification signal.

15 20. The image tracking apparatus as claimed in claim 19, wherein said first series of image frames are image frames of said moving object; and said second series of image frames are optically filtered image frames of said optical identification signal.

20 21. The image tracking apparatus as claimed in claim 20, wherein said picture frame processing system includes a coordinate detector device, which receives said optically filtered image frames of said optical identification signal and generates an X and Y coordinate position signal for said optical identification signal within each of said optically filtered image frames.

25 22. The image tracking apparatus as claimed in claim 21, wherein said X coordinate position signal corresponds to a running average of X coordinate position values determined from each

of said optically filtered image frames; and said Y coordinate position signal corresponds to a running average of Y coordinate position values within each of said optically filtered image frames.

5

23. The image tracking apparatus as claimed in claim 22, wherein
said picture frame processing system further includes a
decoder device, said decoder device receiving said optical
identification signal within each of said optically filtered image
10 frames of said optical identification signal and generating an
electrical decoder signal.

10

24. The image tracking apparatus as claimed in claim 23, wherein
said picture frame processing system includes a graphics
generator, said graphics generator receiving said electrical
decoder signal and generating a graphic image corresponding
15 to said image of said moving object.

15

20

25. The image tracking apparatus as claimed in claim 24, further
comprising a picture-in-picture processor which receives both
said X and Y coordinate position signal and generates said
coordinate position value.

26.

25

The image tracking apparatus as claimed in claim 25, wherein
said picture-in-picture processor receives said broadcast
quality images of said moving object and said graphic image,
and superimposes said graphic image on said broadcast
quality images of said moving object at a position related to
said coordinate position value.

27.

A method of tracking the movement of an image of a
corresponding moving object, the method comprising:

DRAFT - 14.09.2023

5

(a) generating an optical identification signal at said moving object, as said moving object moves; and

(b) receiving an image of said moving object and said optical identification signal, and generating a coordinate position value related to said image of said moving object.

28. The method as claimed in claim 27, wherein said coordinate position value provides an X and Y position coordinate corresponding to said optical identification signal.

10 29. The method as claimed in claim 28, including determining an insertion position utilizing said X and Y position coordinates and inserting an information graphic image at said insertion position.

卷之三